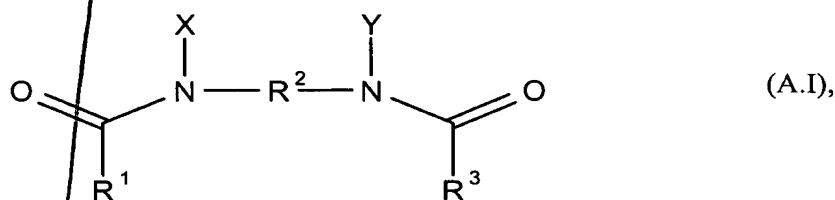


## CLAIMS

1. A surfactant composition comprising  
(A) 1 to 90 wt%, referring to the total amount of components (A) and (B), of one or more gemini surfactant(s) and,  
5 (B) referring to the remainder, based on the total of components (A) and (B), at least one additional detergent component with poor initial foaming characteristics.
2. The surfactant composition of claim 1, characterized in that the surfactant  
10 composition comprises  
(A) 20 to 60 wt%, referring to the components (A) and (B), of one or more gemini surfactant(s) and,  
(B) referring to the remainder, based on the total of components (A) and (B), one or more detergent component(s).
3. A surfactant composition according to any one of claims 1 or 2, further comprising  
15 (C) at least 0.1 wt% water, referring to the total composition.
4. A surfactant composition according to any of claims 1 or 2, further comprising  
20 (D) at least 0.1 wt% of one or more oil component(s), referring to the total composition.
5. A surfactant composition according to any of claims 1 or 2 that comprises, as a detergent component, sulfosuccinates, acyllactylates, alkyl polyglucosides, alkyl isethionates, acylated protein condensates, betaines, acylglutamates, and mixtures thereof.
6. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises, as a detergent component, acyllactylates, alkylisethionates, acylglutamates, and mixtures thereof.
7. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises, as a detergent component,  
35 acyllactylates, acylglutamates, and mixtures thereof.

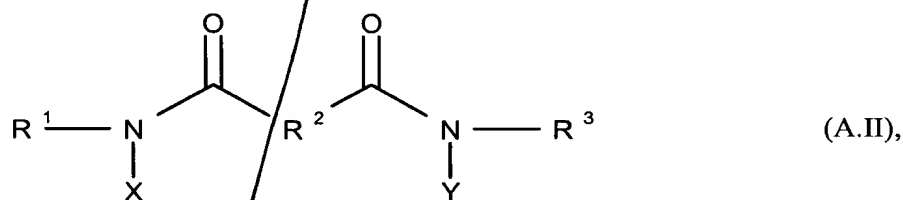
8. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises, as a detergent component, sodium-, potassium-, magnesium-, or calcium salts at the hydroxyl group of linear or branched, saturated or non-adjacently mono- to triunsaturated, cyclic or acyclic carboxylic acids with C<sub>6</sub> to C<sub>24</sub> esterified monomeric lactic acid, or the oligomers thereof, the oligomerization degree of the lactic acid being in the range of from 1.1 to 10.
9. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant comprises at least one nitrogen atom at the link between spacer, hydrophilic group, and hydrophobic group.
10. A surfactant composition according to claim 9, characterized in that the gemini surfactant or the blend thereof comprises an amine- or amide-group-containing spacer with 1 to 12 carbon atoms.
11. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant comprises a hydrophobic double group with a C<sub>6</sub>- to C<sub>24</sub>-hydrocarbon residue each.
12. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises 1 to 30 wt% of component (A), referring to the total amount of ionic surfactants that are not gemini surfactants in conformity with component (A).
13. A surfactant composition according to any of claims 1 or 2, characterized in that the components (A) and (B) are present in the whole composition in a total amount of from 0.1 to 40 wt%.
14. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (A.I)



wherein the substituents have the following meanings:

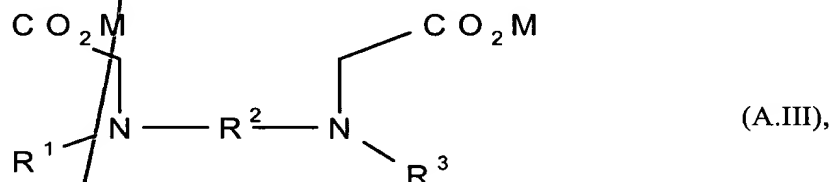
**R<sup>1</sup>, R<sup>3</sup>** C<sub>5</sub>- to C<sub>25</sub>-alkyl group that can be branched, unbranched, saturated, or unsaturated as far as not adjacently diunsaturated;  
**R<sup>2</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkylene;  
**X, Y** (C<sub>2</sub>H<sub>4</sub>O-)<sub>x</sub>(C<sub>3</sub>H<sub>6</sub>O-)<sub>y</sub>-FR; x+y ≥ 1, x: 0-15, y: 0-10 ; and  
**FR** -SO<sub>3</sub>M, -CH<sub>2</sub>-CO<sub>2</sub>M, -P(O)(OM)<sub>2</sub>, H, -C<sub>3</sub>H<sub>6</sub>SO<sub>3</sub>M, -CH<sub>2</sub>(CHOH)<sub>4</sub>CH<sub>2</sub>OH, insofar as x+y=0, wherein M = alkali, (alkyl)ammonium, alkanol ammonium, H, or ½ alkaline earth.

15. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (A.II)



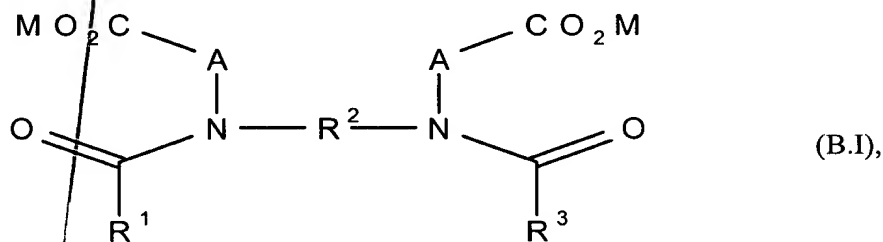
wherein the substituents have the meanings as defined by the general formula (A.I).

16. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (A.III)



wherein the substituents have the meanings as defined by the general formula (A.I).

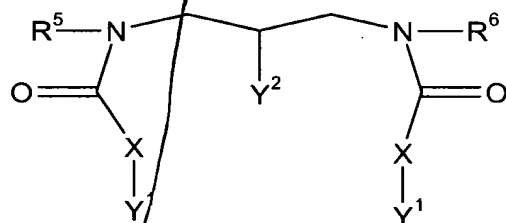
17. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (B.I)



wherein the substituents have the following meanings:

- R<sup>1</sup>, R<sup>3</sup>** C<sub>5</sub>- to C<sub>25</sub>-alkyl group that can be branched, unbranched, saturated, or unsaturated as far as not adjacently diunsaturated;
- R<sup>2</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkylene;
- A** CHR<sup>4</sup>, CH<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>3</sub>H<sub>6</sub>, C<sub>4</sub>H<sub>8</sub>;
- R<sup>4</sup>** aminocarboxylic acid radical; and
- M** alkali, (alkyl)ammonium, alkanol ammonium, H, or ½ alkaline earth.

18. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (B.II)

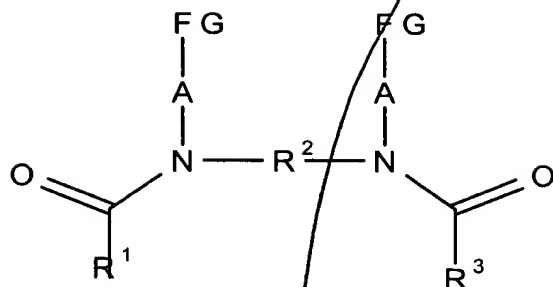


(B.II),

wherein the substituents have the meanings as defined by the general formula (B.I) and

- R<sup>5</sup>, R<sup>6</sup>** represent C<sub>6</sub>- to C<sub>36</sub>-alkyl group that can be branched, unbranched, saturated, or unsaturated as far as not adjacently diunsaturated;
- X** is an alkylene- or alkenylene group having from 1 to 6 carbon atoms, which may be substituted with a hydroxyl group or a sulfonic acid group or a carboxy group;
- Y<sup>1</sup>** is a sulfonate group, a sulfate group, or a carboxyl group; and
- Y<sup>2</sup>** represents a hydroxyl group, a sulfuric acid residue, or -O-(CO)X-COOH.

19. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (B.III)

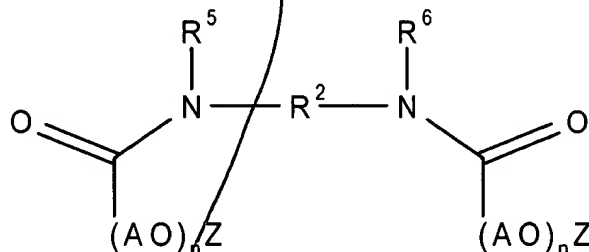


(B.III),

wherein the substituents have the meanings as defined by the general formula (B.I) and

**FG** represents -COOM or -SO<sub>3</sub>M.

20. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (B.IV)



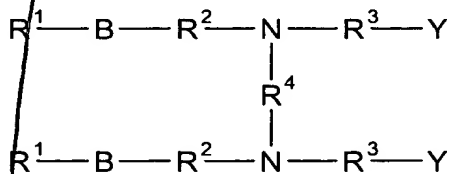
(B.IV),

wherein the substituents have the meanings as defined by the general formulas (B.I) and (B.II), and

**AO** represents alkylene oxide units wherein  $n = 1$  to 20; and

**Z** is -SO<sub>3</sub>M, -C<sub>2</sub>H<sub>4</sub>SO<sub>3</sub>M, -C<sub>3</sub>H<sub>6</sub>SO<sub>3</sub>M, -P(O)(OM)<sub>2</sub>, -CH<sub>2</sub>-COOM, or -C<sub>2</sub>H<sub>4</sub>-COOM.

21. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (C.I),

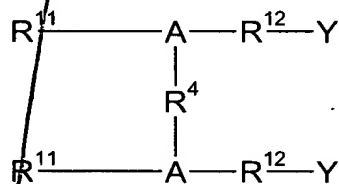


(C.I)

wherein the substituents have the following meanings:

- R<sup>1</sup>** C<sub>5</sub>- to C<sub>25</sub>-alkyl group that can be branched, unbranched, saturated, or unsaturated as far as not adjacently diunsaturated, hydroxy-substituted, or perfluorinated;
- R<sup>2</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkylene or hydroxy-substituted derivatives thereof;
- B** an amide group, a carboxyl group, or a polyether group;
- R<sup>5</sup>** C<sub>1</sub>- to C<sub>4</sub>-alkyl, hydroxy-substituted alkyl, or H;
- R<sup>6</sup>** C<sub>2</sub>- to C<sub>4</sub>-alkylene;
- x** a number from 1 to 20;
- R<sup>3</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkyl, hydroxy-substituted derivatives thereof, R<sup>7</sup>-D-R<sup>7</sup>, or a polyether group having the formula [-O(R<sup>6</sup>-O)<sub>x</sub>-] wherein x is from 1 to 30;
- R<sup>7</sup>** C<sub>1</sub>- to C<sub>6</sub>- alkylene or hydroxy-substituted derivatives thereof;
- D** -O-, -S-, -N(R<sup>8</sup>)-;
- R<sup>4</sup>** alkylene, alkylaryl having from 1 to 12 carbon atoms, the hydroxy-substituted derivatives thereof, or R<sup>9</sup>-D<sup>1</sup>-R<sup>9</sup>;
- R<sup>8</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkyl, hydroxy-substituted alkyl, H, or R<sup>9</sup>-D<sup>1</sup>-R<sup>9</sup>;
- R<sup>9</sup>** C<sub>1</sub>- to C<sub>6</sub>-alkylene, hydroxy-substituted derivatives thereof, or aryl;
- D<sup>1</sup>** -O-, -S-, -SO<sub>2</sub>-, -C(O)-, [-O(R<sup>7</sup>-O)<sub>x</sub>-] wherein x is from 1 to 30, (R<sup>10</sup>)<sub>t</sub>[N(R<sup>10</sup>)]<sub>z</sub>, or aryl;
- R<sup>10</sup>** C<sub>1</sub>- to C<sub>12</sub>-alkyl, hydroxy-substituted alkyl, H, or aryl;
- t, z** are independently a number from 1 to 4; and
- Y** is independently -SO<sub>3</sub>H, O-SO<sub>3</sub>H, -OP(O)(OH)<sub>2</sub>, -P(O)(OH)<sub>2</sub>, -COOH, -CO<sub>2</sub>-C<sub>6</sub>H<sub>4</sub>-SO<sub>3</sub>H, or the salts thereof.

22. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (C.II)



(C.II),

wherein the substituents have the meanings as defined by the general formula (C.I) and

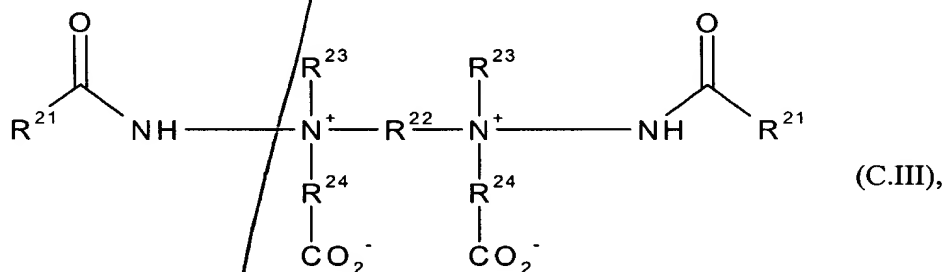
$R^{11}$  is  $C_5$ - to  $C_{23}$ -alkyl group that can be branched, unbranched, saturated, unsaturated as far as not adjacently diunsaturated, hydroxy-substituted, perfluorinated, or  $R^{14}$ -B- $R^2$ ;

$R^{14}$  is  $C_1$ - to  $C_{12}$ -alkyl group that can be branched, unbranched, saturated, unsaturated as far as not adjacently diunsaturated, or the hydroxy-substituted derivatives thereof;

$R^{12}$  means  $C_1$ - to  $C_{12}$ -alkylene group that can be branched, unbranched, saturated, unsaturated as far as not adjacently diunsaturated, the hydroxy-substituted derivatives, an amide group, a carboxyl group, a polyether group, or  $R^9$ -D'- $R^9$ ; and

A is  $-CR^6=$  or  $-N=$ , if whenever A is equal to  $-N=$ ,  $R^{11}$  represents  $R^{14}$ -B- $R^2$ .

A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (C.III)



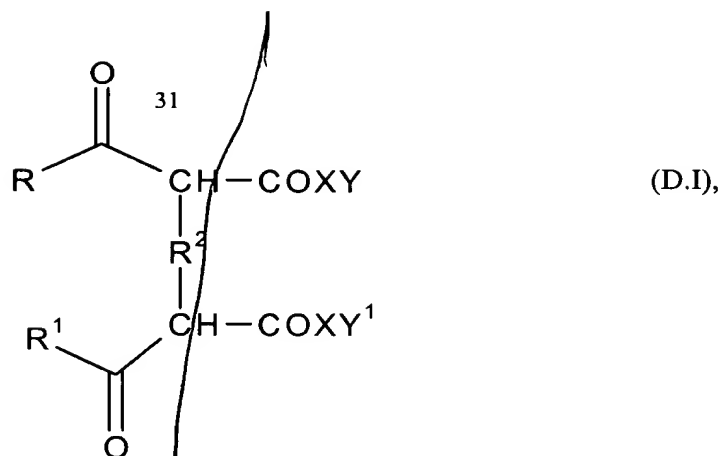
wherein the substituents have the meanings as defined by the general formulas (C.I) and (C.II) and

$R^{21}$  represents  $C_5$ - to  $C_{23}$ -alkyl, branched, unbranched, saturated, or unsaturated as far as not adjacently diunsaturated;

$R^{22}$ ,  $R^{24}$  are  $C_1$ - to  $C_6$ -alkylene and

$R^{23}$  is methyl, ethyl, propyl, or a polyether group.

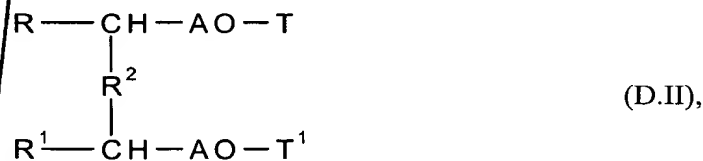
24. A surfactant composition according to one of claims 1 or 2, characterized in that the gemini surfactant has the general formula (D.I)



wherein the substituents have the following meanings:

- R, R<sup>1</sup>** C<sub>5</sub>- to C<sub>30</sub>-alkyl, branched or unbranched, saturated, optionally unsaturated as far as not adjacently diunsaturated, hydroxy-substituted or perfluorinated;
- R<sup>2</sup>** C<sub>1</sub>- to C<sub>10</sub>-alkylene, arylene, or the hydroxy-substituted derivatives thereof, a polyether [-O(R<sup>4</sup>O)<sub>x</sub>], -S-, -SO<sub>2</sub>-, -O-, -S-S-, -O-R<sup>5</sup>-O-, or -S-R<sup>5</sup>-S-; variable for a direct bond between the two α-carbons;
- R<sup>4</sup>** C<sub>2</sub>- to C<sub>4</sub>-alkylene;
- R<sup>5</sup>** C<sub>1</sub>- to C<sub>10</sub>-alkylene, arylene, or alkyl arylene, -N(R<sup>6</sup>)-, or -(NR<sup>6</sup>)-R<sup>7</sup>-(NR<sup>6</sup>)-;
- R<sup>6</sup>** C<sub>1</sub>- to C<sub>6</sub>-alkyl;
- R<sup>7</sup>** C<sub>1</sub>- to C<sub>6</sub>-alkyl, wherein R<sup>7</sup> and R<sup>6</sup> can also be part of a heterocyclic ring;
- X** polyether having the formula [-O(R<sup>4</sup>O)<sub>x</sub>], wherein x is a number from 1 to 30, -O-, NZ;
- Z** C<sub>1</sub>- to C<sub>10</sub>-alkyl, aryl, alkylaryl, or H, and
- Y, Y<sup>1</sup>** are independently H, -CH<sub>2</sub>-COOH and salts, a hydrocarbon radical having at least two hydroxyl groups.

25. A surfactant composition according to one of claims 1 or 2, characterized in that the gemini surfactant has the general formula (D.II)

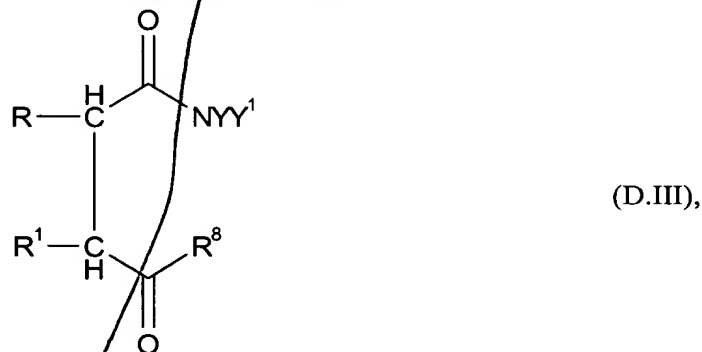


wherein the substituents have the meanings as defined by the general formula (D.I) and



**AO** means  $-C(O)-$ ,  $-C(O)-[-O(R^4O)_x-]$ ,  $-CH_2-[-O(R^4O)_x-]$ ,  $-CH_2-O-$ ;  
**T, T<sup>1</sup>** are independently  $-OM$ ,  $-H$ ,  $-CH_3$ ,  $-C_2H_5$ ,  $-SO_3M$ ,  $-CH_2COOM$ ,  
 $-C_2H_4-COOM$ ,  $-C_3H_6-SO_3M$ ,  $-O-P(O)(OM)_2$  and  
**M** is alkali,  $\frac{1}{2}$  alkaline earth, ammonium, mono-, di-,  
 trialkanolammonium, or H.

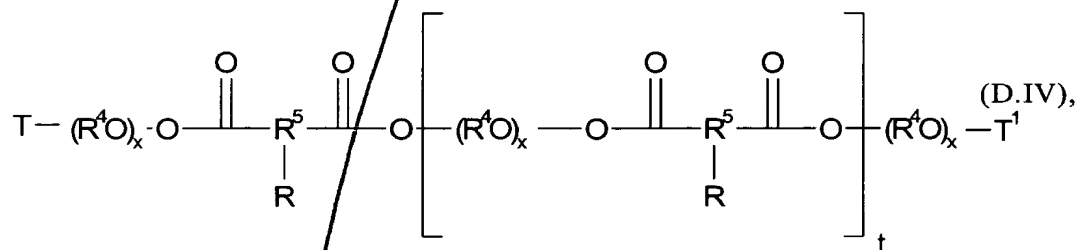
26. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (D.III)



wherein the substituents have the meanings as defined by the general formulas (D.I) and (D.II), and

**R<sup>8</sup>** represents  $NYY^1$ ,  $-O(R^4O)_xH$  or  
 $-O(R^4O)_x-C(O)-CHR-CHR^1-C(O)NYY^1$ .

27. A surfactant composition according to any of claims 1 or 2, characterized in that the gemini surfactant has the general formula (D.IV)



wherein the substituents have the meanings as defined by the general formula (D.I), (D.II), and (D.III), and

**t** is an integer from 1 to 100.

28. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises a gemini surfactant of the general

formula (AI) as component (A) and sulfosuccinate, acyllactylate, alkyl isethionates, betaines, acylglutamates, and mixtures thereof as component (B).

5 29. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises a gemini surfactant of the general formula (AIII) as component (A) and acyllactylates, acylglutamates, and mixtures thereof as component (B).

10 30. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises a gemini surfactant of the general formula (CII) as component (A) and acyllactylates, acylglutamates, alkyl isethionates, and mixtures thereof as component (B).

15 31. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises a gemini surfactant of the general formula (DI) as component (A) and acyllactylates, acylglutamates, alkyl isethionates, and mixtures thereof as component (B).

20 32. A surfactant composition according to any of claims 1 or 2, characterized in that the surfactant composition comprises a gemini surfactant of the general formula (DI) as component (A) and acyllactylates, acylglutamates, alkyl isethionates, and mixtures thereof as component (B).

25 33. The surfactant composition of claim 8 wherein the oligomerization degree of the lactic acid is in the range of from 1.1 to 4.

30 34. The surfactant composition of any of claims 1 or 2 wherein said gemini surfactant comprises a hydrophilic double (head) group comprising at least one alkoxyated residue bearing a group selected from sulfonic acid-, carboxylic acid-, phosphonic acid-, polyalcohol-, polyalkylene-oxide group, salts thereof, and mixtures thereof.

35 35. The surfactant composition of any of claims 1 or 11 wherein said gemini surfactant comprises a hydrophilic double (head) group comprising at least one alkoxyated residue bearing a group selected from sulfonic acid-, carboxylic

sub  
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acid-, phosphonic acid-, polyalcohol-, polyalkylene-oxide group, salts thereof, and mixtures thereof.

5 36. The surfactant composition of claim 12 wherein said anionic surfactant are anionic surfactants.

37. The surfactant composition of claim 13 wherein the components (A) and (B) are present in the whole composition in the total amount of from 0.1 to 10 wt%.

10 38. The surfactant composition of claim 20 wherein said alkylene oxide units comprise a single alkylene oxide species.

39. The surfactant composition of claim 20 wherein said alkylene oxide units comprise mixed species.

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40. The surfactant composition of claim 39 wherein said alkylene oxide units are randomly arranged.

20 41. The surfactant composition of claim 39 wherein said alkylene oxide units are in block form.

25 42. The surfactant composition of claim 24 wherein said hydrocarbon radical having at least two hydroxyl groups is selected from the class consisting of erythrose, threose, ribose, arabinose, xylose, fructose, lyxose, allose, altrose, glucose, mannose, galactose, and mixtures thereof.

43. The surfactant composition of claim 27 wherein t is from 1 to 20.

30 44. The surfactant composition of claim 43 wherein t is from 1 to 4.